

ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6950.15B

4/10/86

SUBJ: ARTCC CRITICAL LOAD CIRCUITS AND CONFIGURATION

1. PURPOSE. This order establishes the critical loads at air route traffic control centers (ARTCC) and the criteria for the branch circuit configuration. It assigns responsibilities and provides guidelines for configuration control of the critical power distribution system at ARTCC's supporting the National Airspace System (NAS).

2. DISTRIBUTION. This order is distributed to the Associate Administrator for Development and Logistics and Associate Administrator for Air Traffic; branch level in the Systems Engineering Service, Program Engineering and Maintenance Service, Advanced Automation Program Office, and Office of Flight Standards and the Metropolitan Washington Airports; to division level in regional Airway Facilities and Air Traffic Divisions; to division level at the FAA Technical Center and Aeronautical Center; and to all ARTCC sectors.

3. CANCELLATION. Order 6950.15A, ARTCC Critical Load Circuits and Configuration, dated 4/17 /76, is canceled.

4 BACKGROUND. The electrical power distribution system at ARTCC's is divided into two separate and independent categories identified as critical and noncritical (essential and building service) loads. Despite documentation describing these systems, there exists a difference of opinion and interpretation as to what electronic equipment shall operate on critical and what equipment shall operate on noncritical (essential and building service) loads. The equipment according to function and sensitivity may require normal, regulated, and/or uninterruptible electrical power supply. The requirements of equipment need to be defined, then prioritized in accordance with the impact of outage on the control of air traffic. The configuration of critical loads needs to be defined to assure standardization and to minimize. the impact of power outages on air traffic control as the systems are automated through implementation of the NAS Plan.

5. POLICY.

a. All systems/equipment not listed in paragraph 8a that are presently powered by the critical circuits shall be disconnected and removed from the critical power system.

b. The existing critical systems/equipment shall be removed from the critical circuits after new critical systems/equipment are tested and commissioned per approved implementation scheme, with cutover to new systems/equipment replacing them.

Distribution: A-W(DL/AT)-1; A-W(ES/PM/AP/FS/MA)-3;
A-X(AF/AT)-2; A-YZ-2; A-FAF-3(STD)

initiated By: AES-110

c. All new critical systems/equipment shall first be tested by the test Power Conditioning System serving critical panel critical power center (CPC) distribution panel (DP) until it is assured that the new systems/equipment are compatible with the existing critical power systems and have passed the operation readiness demonstration test.

d. The existing critical maintenance panels shall be used for performing scheduled maintenance or modification. They can also be utilized in transition phase of equipment replacement.

e. Any new critical systems/equipment not listed in this order shall not be installed at a facility and connected to the critical power system without prior approval by configuration control decision (CCD). The office of primary interest is responsible for justifying and documenting the requirement for critical power and initiating the request for CCD.

f. All critical telecommunications equipment that does not have its own battery backup system shall be put on critical power.

6. DEFINITIONS.

a. Configuration Management. 'Configuration management is a formal set of procedures by which a uniform system of identification, design control, modification scheduling, and status accounting are accomplished.

b. Critical Systems. The critical systems are those systems that are required to operate for the uninterrupted control of air traffic,

(1) Will cease operation if fluctuation in excess of 8 milliseconds occurs or would be the cause of other equipment or subsystems to cease operation for 30 seconds or more.

(2) Will significantly jeopardize the air traffic controllers' mission due to a frequent or intermittent power fluctuation of short duration.

(3) Are vulnerable to malfunction because of power outages of short duration.

(4) Critical systems/equipment are listed in paragraph 8a.

c. Noncritical Systems.

(1) The noncritical systems are those systems that support operation of critical systems/equipment and those in a noncommissioned test status undergoing test in a test or maintenance area and those that do not fall into the categories listed in paragraph 8a. Noncritical systems can be further defined as essential and building service systems.

(2) Essential systems/equipment are environmental and operational support services that are required to sustain critical systems/equipment. Building services systems/equipment are those building services that can be shed without any major or immediate impact on the air traffic operation,

(3) Noncritical systems/equipment are listed in paragraph 8b.

7. SYSTEM CONFIGURATION. Each ARTCC has two highly reliable and maintainable power distribution systems as described in paragraph 6. To minimize the impact of a CPC or DP failure on air traffic activities, an analysis of a branch circuit configuration scheme shall be developed such that the loss of power to a CPC or DP would have the least possible impact on air traffic control capability. In order to minimize CPC or DP outage, system configuration development shall be achieved from the following guidelines. In developing the optimum branch circuit configuration, the power must be balanced among DP's, CPC's, and phases at the main critical output bus.

a. Critical subsystems are classified into two categories:

(1) Category 1, those that are fully operational within 30 seconds following a power fluctuation.

(2) Category 2, those that are not fully operational within 30 seconds following a power fluctuation.

NOTE: Category 1 subsystems will remain operational following an automatic load transfer from a failed CPC/DP to a normal CPC/DP. Category 2 subsystem operation will be unacceptable following such a load transfer. Primary emphasis must, therefore, be placed on the operational analysis and power configuration for Category 2 subsystems.

b. Like subsystems should be distributed among the CPC and DP to avoid total loss of a subsystem.

c. Equipment at adjacent sectors should be connected to different power center distribution panels to avoid simultaneous loss of adjacent sectors in case of a CPC/DP failure.

d. The subsystem whose operation is dependent on the operation of another subsystem (e.g., the remote radar data set is dependent on the data receiving group for an individual radar system) should be connected to the same CPC through the same DP to reduce the number of possible power failure points.

e. Redundant capability subsystems, such as peripheral adapter modules, and redundant power supplies that power multiple redundant subsystems should be connected to a different CPC or DP. Similarly, power supply loads should be distributed among the power suppliers to achieve an optimum power configuration beyond the ac power demarcation.

8. CRITICAL AND NONCRITICAL SYSTEMS/EQUIPMENT. The following is a list of critical and noncritical systems/equipment as derived from the NAS Plan.

a. Critical Systems/Equipment. The following systems/equipment are designated critical and shall be connected to the critical power distribution system which includes standby power (engine generator) and an uninterruptible power source. The Master End Item List in NAS-MD-001, NAS Subsystem Baseline Configuration and Documentation Listing, specifies the end items under configuration management, end item numbers, nomenclature to be used in identifying end items, and level of detail to which subsystems will be added to the Master End Item List in revision 7 of NAS-MD-001.

(1) Existing Critical Systems/Equipment. The existing critical systems/equipment shall be removed from critical power after new critical systems/equipment are tested and commissioned per approved implementation scheme. Those systems not to be replaced shall remain on critical power systems.

- (a) IBM 9020 A/D computer complex.
- (b) Computer display channel, radar controller portion.
- (c) Computer display channel, computer updating portion.
- (d) 9020 E display channel processor.
- (e) Radar display subsystems for 9020 E - display channel processor.
- (f) Flight strip printer.
- (g) Flight data entry and printout equipment.
- (h) Input/output typewriter (OPS).
- (i) Coded time source system.
- (j) Direct access radar channel.
- (k) Interfacility data set (modems).
- (l) System maintenance monitor system.
- (m) Medium speed line printer.
- (n) AN/FYA-85(V), converter group, signed data--data receiver group.
- (o) AN/FYA-84, indicator group (RAPPI)--display console unit.

- (p) Radar remoting.
 - (q) Air-to-ground communications equipment, including control equipment, voice amplifier equipment, UHF and VHF radiofrequency equipment, backup radiofrequency equipment, voice-recorders, and transceivers.
 - (r) Crypto.
 - (s) Line automatic switching system.
 - (t) Standby bus synchronizing circuit.
 - (u) Multiplexing modems and automated network management systems.
 - (v) Maintenance processor system.
 - (w) Central control and monitoring system (H316 computer console and CPU power supply only).
 - (x) En route automated radar tracking system.
 - (y) Flight data processing system.
 - (z) National airspace data interchange network.
 - (aa) Remote radar weather display systems.
- (2) New Critical Systems/Equipment. The following new critical systems/equipment shall be placed on critical:
- (a) Host computer.
 - (b) Voice switching and control systems.
 - (c) Flight data input/output system.
 - (d) Sector suite and advanced automation system.
 - (e) Flight service data processing system.
 - (f) Central weather processor.
 - (g) Oceanic display and planning system.
 - (h) National airspace data interchange network concentrator.
 - (i) Leased Service "A" system. Only equipment operated and maintained in accordance with FAA standards shall be on main critical bus.
 - (j) Apollo microprocessor system "S."

(k) Consolidated notice to airmen system.

b. Noncritical Systems/Equipment. The following systems/equipment are designated noncritical and shall not be connected to the critical power distribution load:

(1) All systems/equipment not listed under critical systems/equipment list.

(2) Map and console lights on A, D, and R control consoles.

(3) All convenience receptacles except those built in the equipment on critical power.

(4) Critical electronic systems/equipment which are in a noncommissioned test or maintenance area.

(5) Test equipment.

(6) Lights, except critical system/equipment indicating lights.

(7) Environmental support systems/equipment.

(8) Telecommunications system with battery systems.

(9) Environmental control circuits.

(10) Map lights and overhead lights inside the crypto room.

9. APPLICABILITY. This order applies to the New York TRACON and to all ARTCC's or area control facilities (ACF) when en route and terminal facilities are combined per the NAS.

10. RESPONSIBILITIES.

a. The Director, Systems Engineering Service (AES), will issue policies and standards and provide systems configuration management control (CMC) for all the NAS under CMC. AES will:

(1) Develop and maintain required documentation for the configuration control of the critical power supply system.

(2) Assign and record appropriate end item numbers to all systems/equipment and associated distribution panel boards.

(3) Process all NAS change proposals.

(4) Identify future requirements for future critical power at ARTCC.

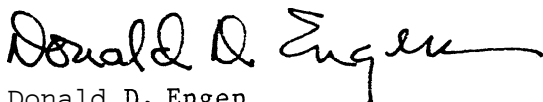
b. The Director, Program Engineering and Maintenance Service, is responsible for developing, acquiring, implementing, operating, and modifying specific systems, subsystems, facilities, equipment, and computer programs as required to ensure implementation of this order. The Director is also responsible for monitoring of the critical power capacity control.

c. The Associate Administrator for Air Traffic is responsible for identifying critical air traffic operational systems/equipment requirements necessary for the control of the air traffic and coordinating them through the configuration management process.

d. The Director of Flight Standards is responsible for identifying flight operational requirements necessary for the control of air traffic.

e. The Director, Advanced Automation Program Office (AAP), is responsible for the development and acquisition of the systems, facilities, equipment, and computer program associated with AAP.

f. The regional directors and directors of the FAA Technical Center and Aeronautical Center are responsible for providing all necessary field and technical support to the above-mentioned offices based on facility performance requirements. The regional directors are responsible for the development and maintenance of baseline documents including drawings for the existing and future systems placed on critical and noncritical branch circuit panel boards and breakers.



Donald D. Engen
Administrator

